

وَقُلْ رَبِّ زِدْنِي عِلْمًا



PERIPHERAL NERVOUS SYSTEM



SUBJECT : Anatomy

LEC NO. : 10

DONE BY : Batool Alzubaidi + Hashem Ata

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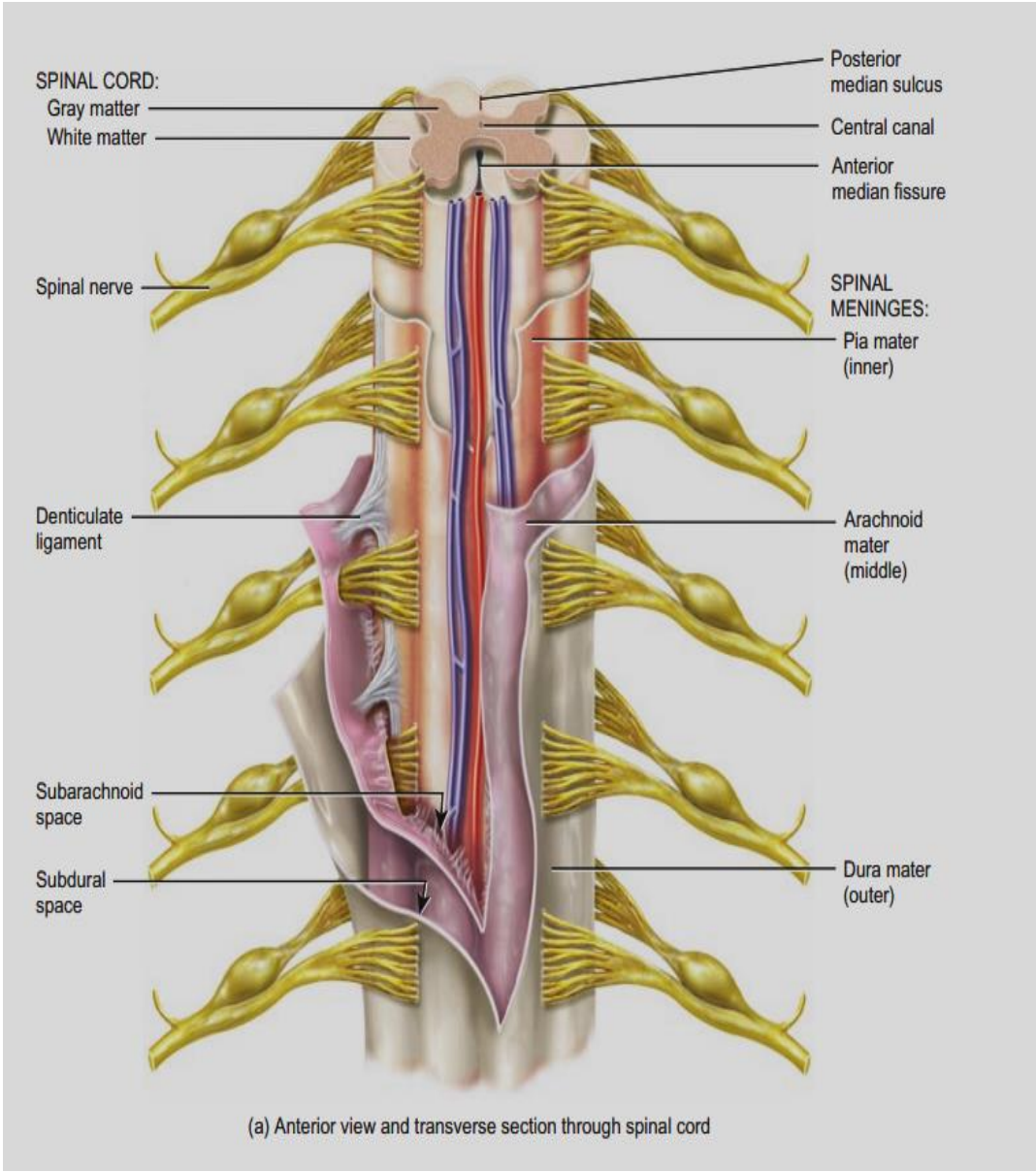
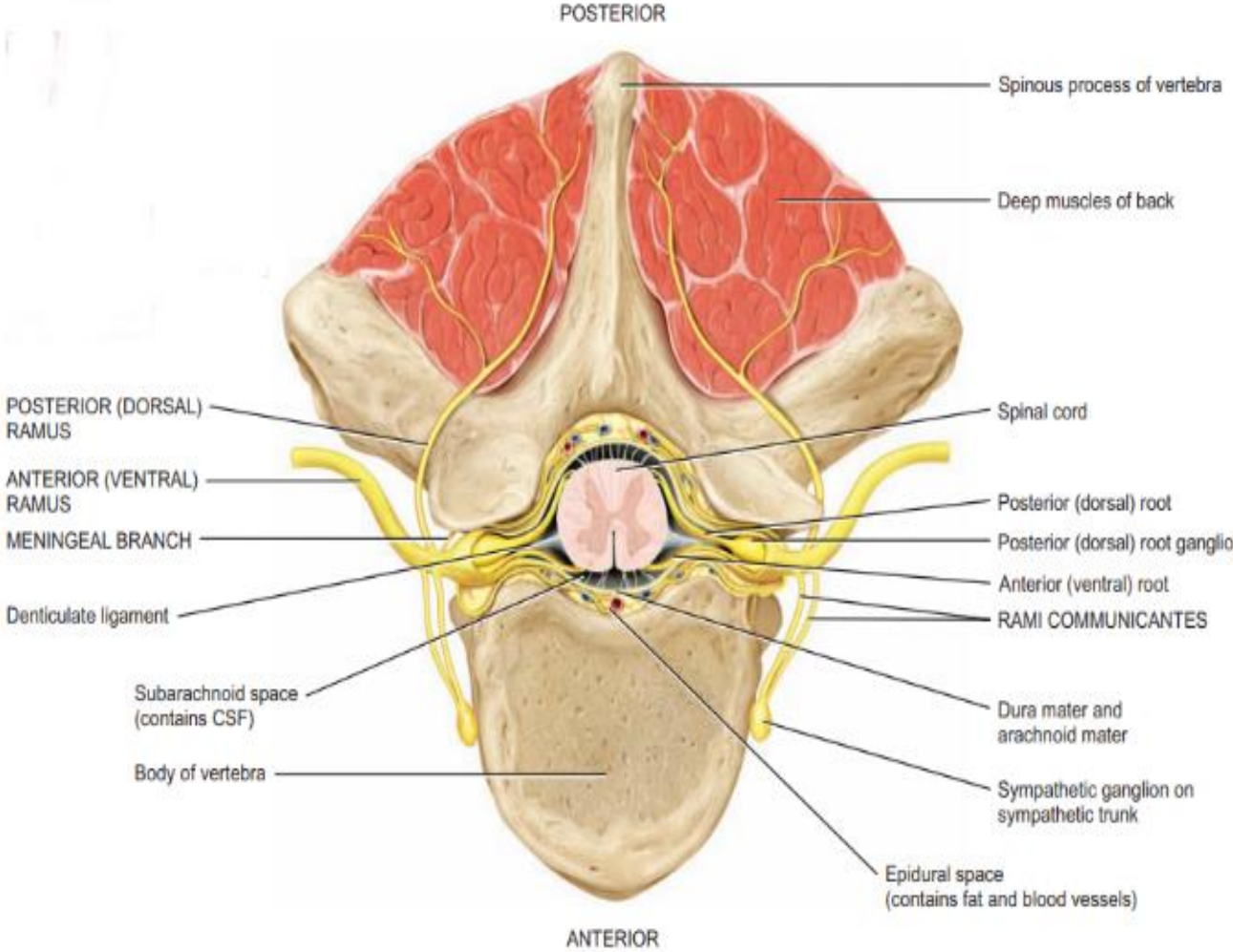
PNS..

Lecture (10)
Cervical Plexus
&
Brachial plexus

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Spinal nerves



احنا عنا ٣١ pair of spinal nerves كل واحد طالع من
 ال corresponding segment، الي بصير انه كل واحد
 منهم emerges بحيث يكون في anterior root الي هو ال
 motor و posterior root الي هو ال sensory مع ال
 mixed trunk الي هو motor and sensory fibers بعديها
 ال mixed بنقسم ل ventral and dorsal rami

ال dorsal rami directed backwards to supply skin
 and muscles of the back اما ال ventral rami بعملوا
 ال plexuses ال cervical, brachial, lumbar, sacral .. لكن
 هل كل ال ventral rami بعملوا plexus ؟ لا ال ventral
 thoracic ال تعملوا ما بعملوا كل واحد فيهم بمشي لحاله
 عشان يعملوا ال intercostal nerves عدد هم ١٢ كلهم
 intercostal ما عدا رقم ١٢ اسمه subcostal

Cervical Plexus

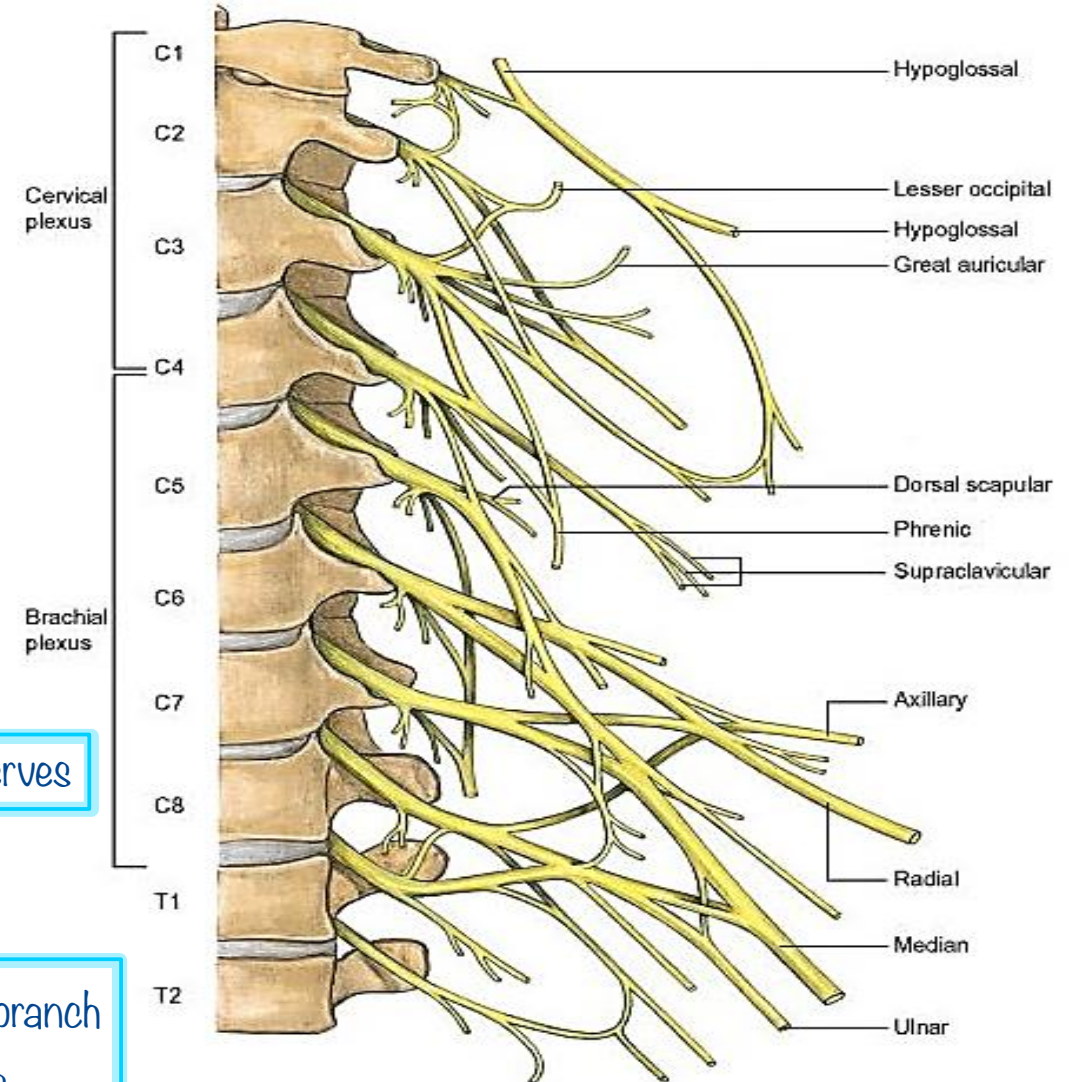
Definition:

- The cervical plexus is a complex network of nerves that is formed by the anterior rami of the first four cervical nerves (C1–C4), with contributions from C5.
- They are joined by connecting branches form loops.
- It lies one on each side of the neck alongside the first four cervical vertebrae.

Some supplied by cranial nerves, some supplied by dorsal rami of some spinal nerves

- It supplies some neck muscles and the diaphragm, and areas of skin on the head, neck and chest.

Phrenic nerve a branch of cervical plexus



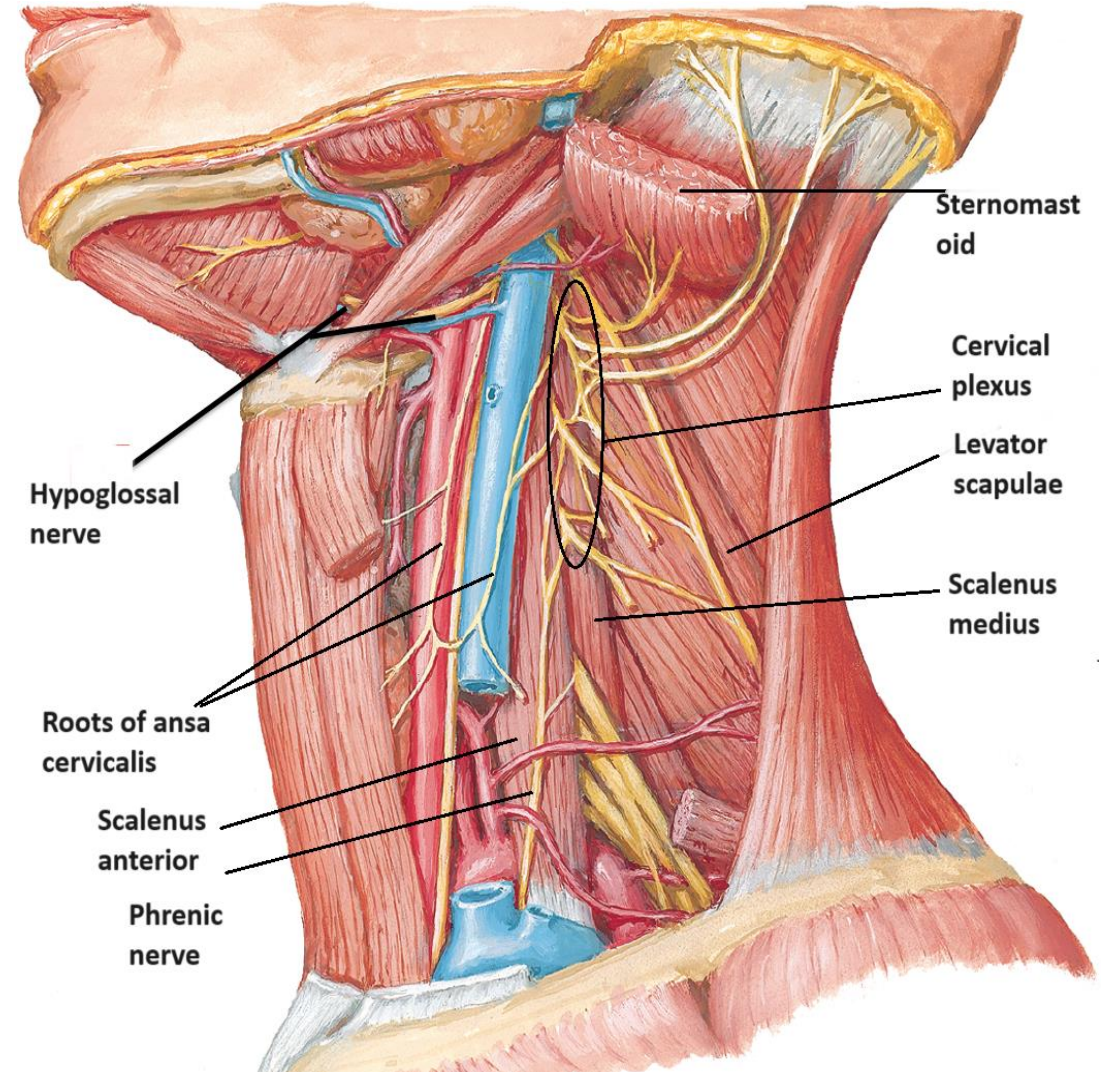
Relations of the cervical plexus:

Posterior relations:

- Lie in front of the levator scapulae and the scalenus medius muscles.

Anterior relations:

- It lies deep to the deep fascia (prevertebral) and sternocleidomastoid.



Branches of the cervical plexus:

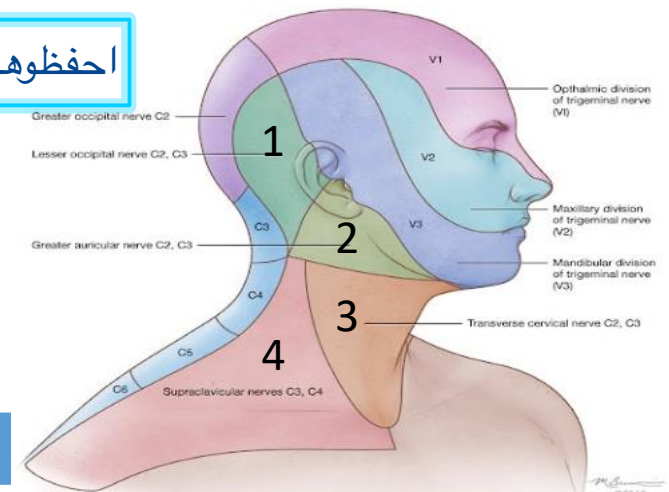
احفظوهم بالاستعانة بالصورة اعمل photo-memory عشان ما تنسوا

A-Cutaneous branches:

Branch supplies skin

- Appear at the posterior triangle of the neck.

الاسم حسب ال area الي بعملها supply او ال direction الي ماشي فيه



Nerve	Origin	Distribution	Course
1-Lesser occipital nerve	C2	Skin over scalp behind ear & auricle.	Ascends along the posterior border of the sternocleidomastoid muscle
2-Greater auricular nerve	C2& C3	Skin over the angle of the mandible & auricle.	Ascends across the sternocleidomastoid muscle.
3-Transverse cervical nerve	C2& C3	Skin on the anterior and lateral surfaces of the neck.	Passes forward across sternocleidomastoid muscle.
4-Supraclavicular nerves –Medial	C3& C4	-Skin of the chest, as far as the midline and as low as the level of the second rib.	Crosses the medial end of the clavicle
Intermediate		-Skin of the chest wall as low as the second rib	Crosses the middle of the clavicle
Lateral		-Skin over the shoulder and the upper half of the deltoid muscle.	Crosses the lateral end of the clavicle

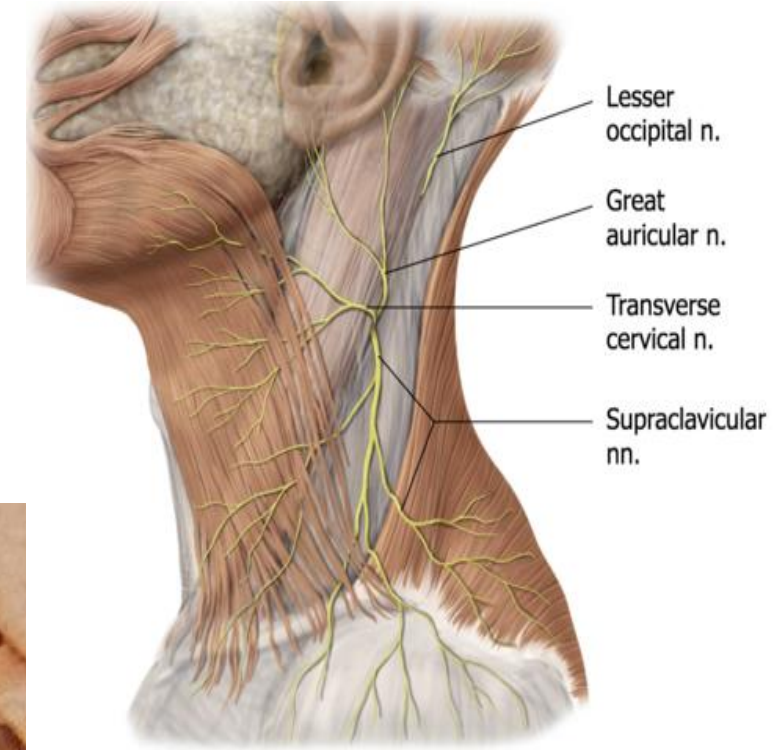
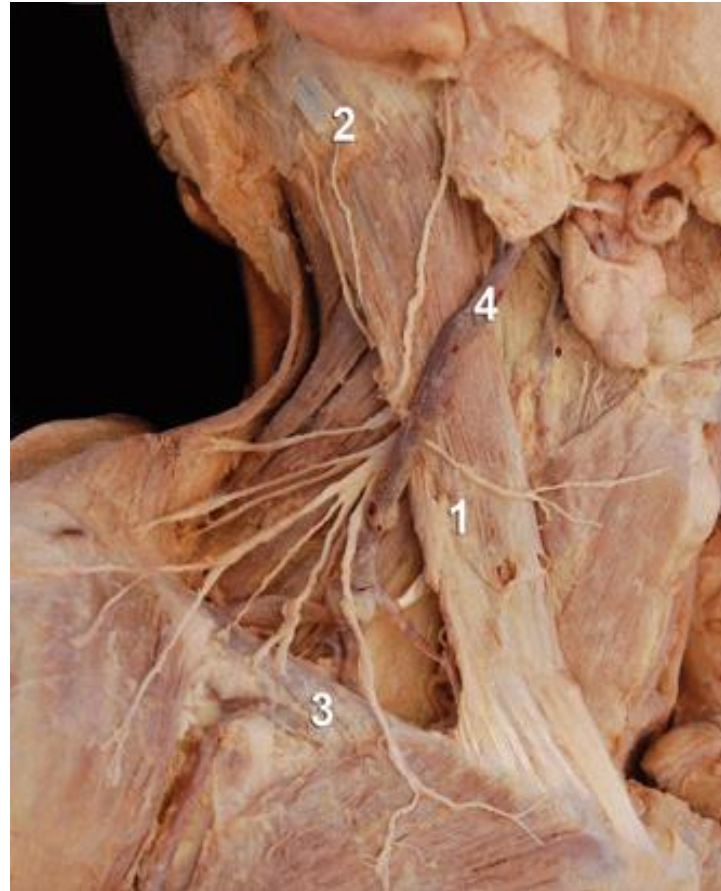
Erb's point:

هم طلعو deep بس ما راح يضلوا deep لانهم cutaneous
لازم يطلعو عشان يقدروا يعملوا supply لل skin

- It is a point on the middle of posterior border of the sternocleidomastoid muscle, where the four cutaneous branches of the cervical plexus emerge from behind the muscle.

- It is utilized when performing Superficial cervical plexus block

لغايات التخدير



B-Muscular branches of the cervical plexus:

- They are located deep to the sensory branches.

- **They are;**

- ✓ Branches to scalene muscles.

- ✓ Branches to prevertebral muscles.

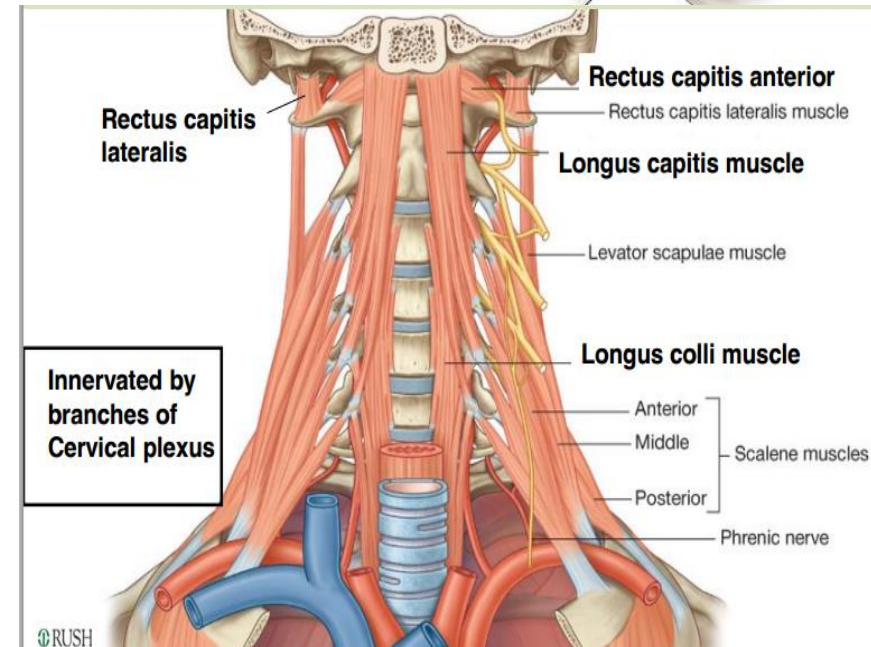
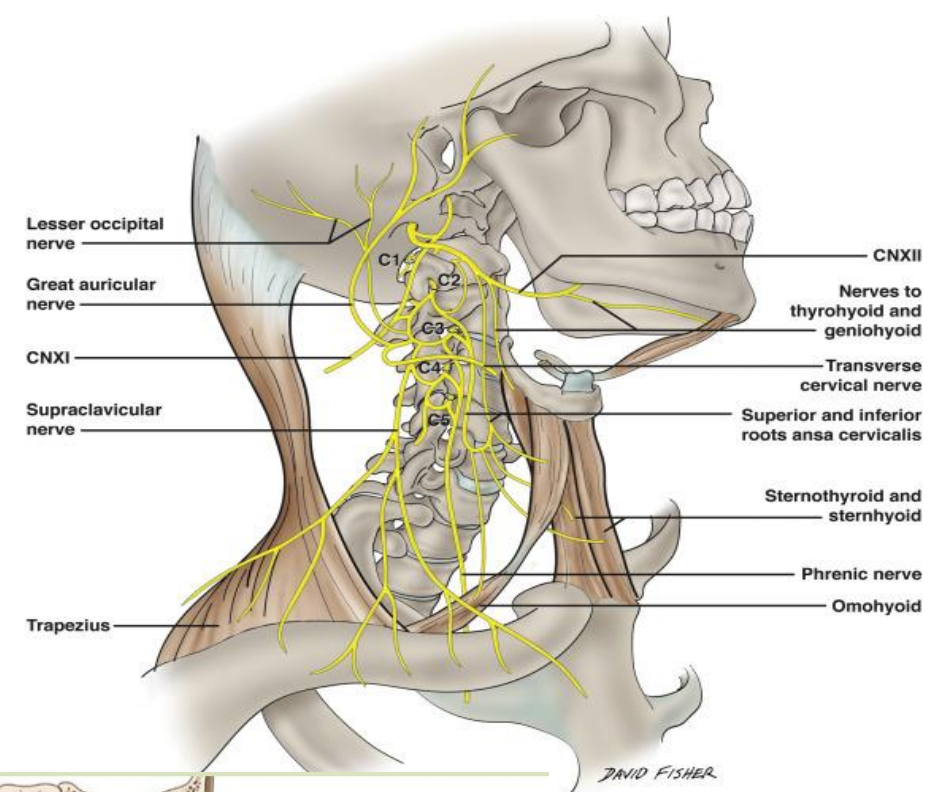
- ✓ Branches to infrahyoid muscles via **ansa cervicalis** Loop of nerve formed from cervical plexus

- ✓ **Phrenic nerve:** supplies the diaphragm.

- ✓ To levator scapulae (C3 & 4).

- ✓ To sternomastoid (C2&3), trapezius (C3 &4) (proprioceptive).

Because their supply by accessory nerve



Phrenic Nerve

Mixed nerve

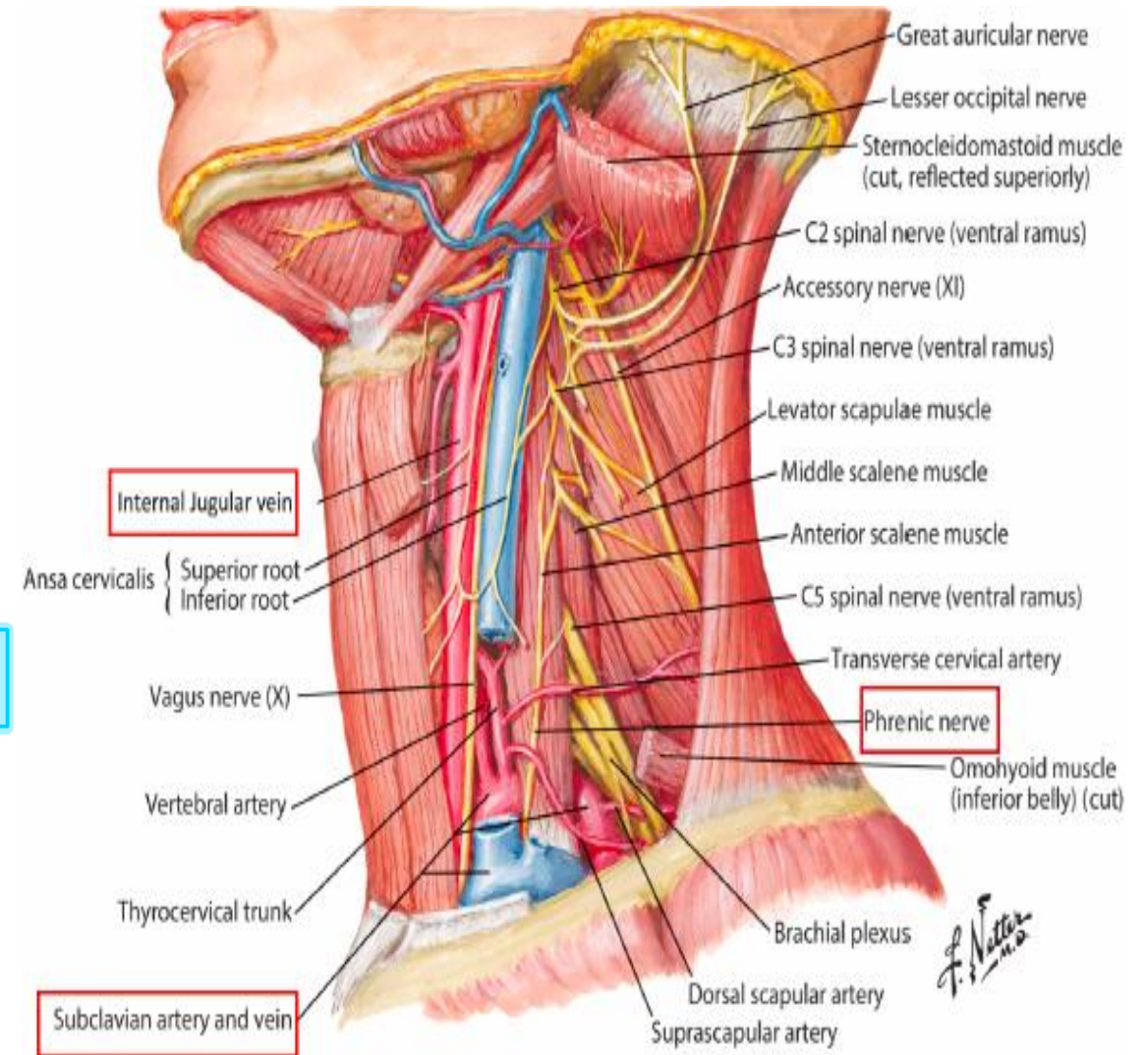
- The longest nerve of the cervical plexus.
- **Nerve roots: C3, C4 and C5.**

Motor Functions:

- Each nerve gives motor supply to the ipsilateral side of the diaphragm (primary muscle involved in breathing)

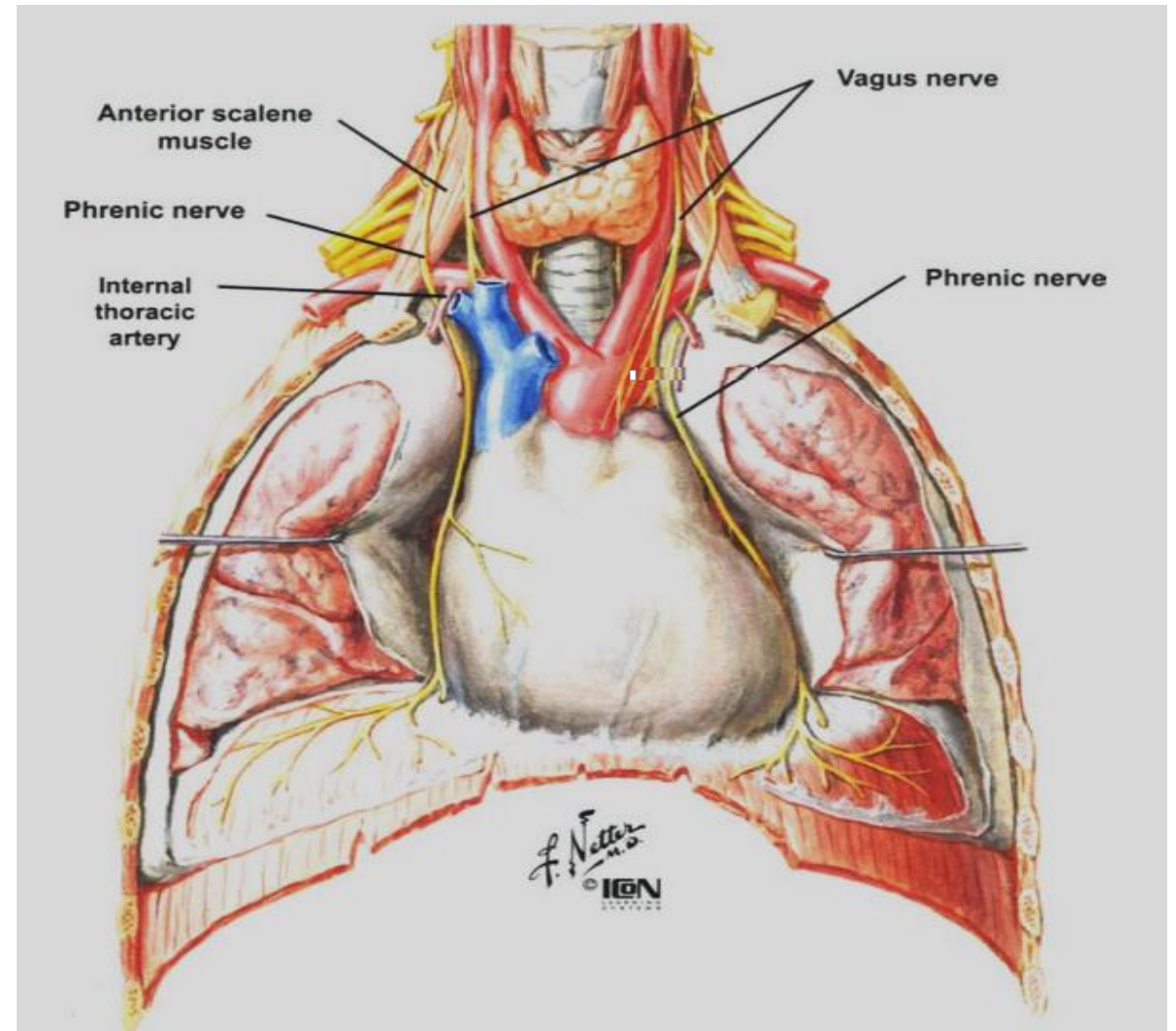
Sensory Functions:

- Sensory innervation to; Peripheral part → intercostal nerves
- Central part of the diaphragm.
- Pericardium.
- Mediastinal & diaphragmatic pleura.



Course & Relations of the phrenic nerve:

- It descends across the anterior surface of the **scalenus anterior.**
- It enters the thorax **between** the subclavian artery and the subclavian vein.
- It descends **anteriorly to the root** of the corresponding lung.
- **Courses along** the corresponding side of the pericardium.
- **Pierces** the diaphragm.



Causes of phrenic nerve damage include:

- Trauma to the chest, such as a car accident.
- Surgical procedures.
- Tumors or neurological disorders.

Result in

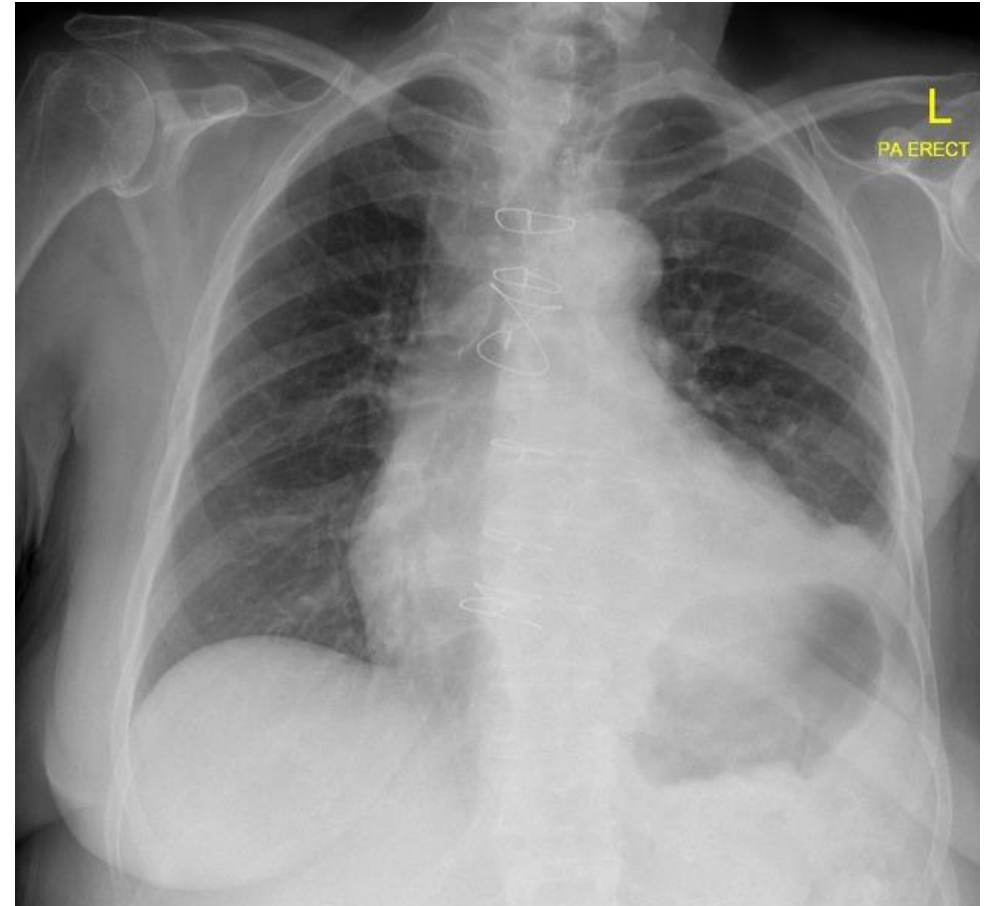
- Paralysis of the diaphragm.
- Unilateral diaphragmatic paralysis (hemi-diaphragm paralysis) or bilateral diaphragmatic paralysis.

Rare

- People with unilateral diaphragmatic paralysis may not notice any symptoms. Some may notice breathing difficulties only during activity or when they're lying down.
- Those with bilateral paralysis have symptoms, including:
 - Recurrent pneumonia.
 - Severe shortness of breath
 - Sleep apnea.
 - Excessive daytime fatigue

Diaphragmatic paradox or paradoxical diaphragm phenomenon:

- The diaphragm moves opposite to the normal directions of its movements, as it moves upwards during inspiration and downwards during expiration.
- Findings on an x-ray suggestive of unilateral diaphragmatic paralysis include elevated hemidiaphragm in the paralyzed side & small lung volumes.
- Findings on an x-ray suggestive of bilateral diaphragmatic paralysis include elevation of the hemidiaphragms.



Left hemi-diaphragm paralysis.

موجود ہے

Accessory phrenic nerve:

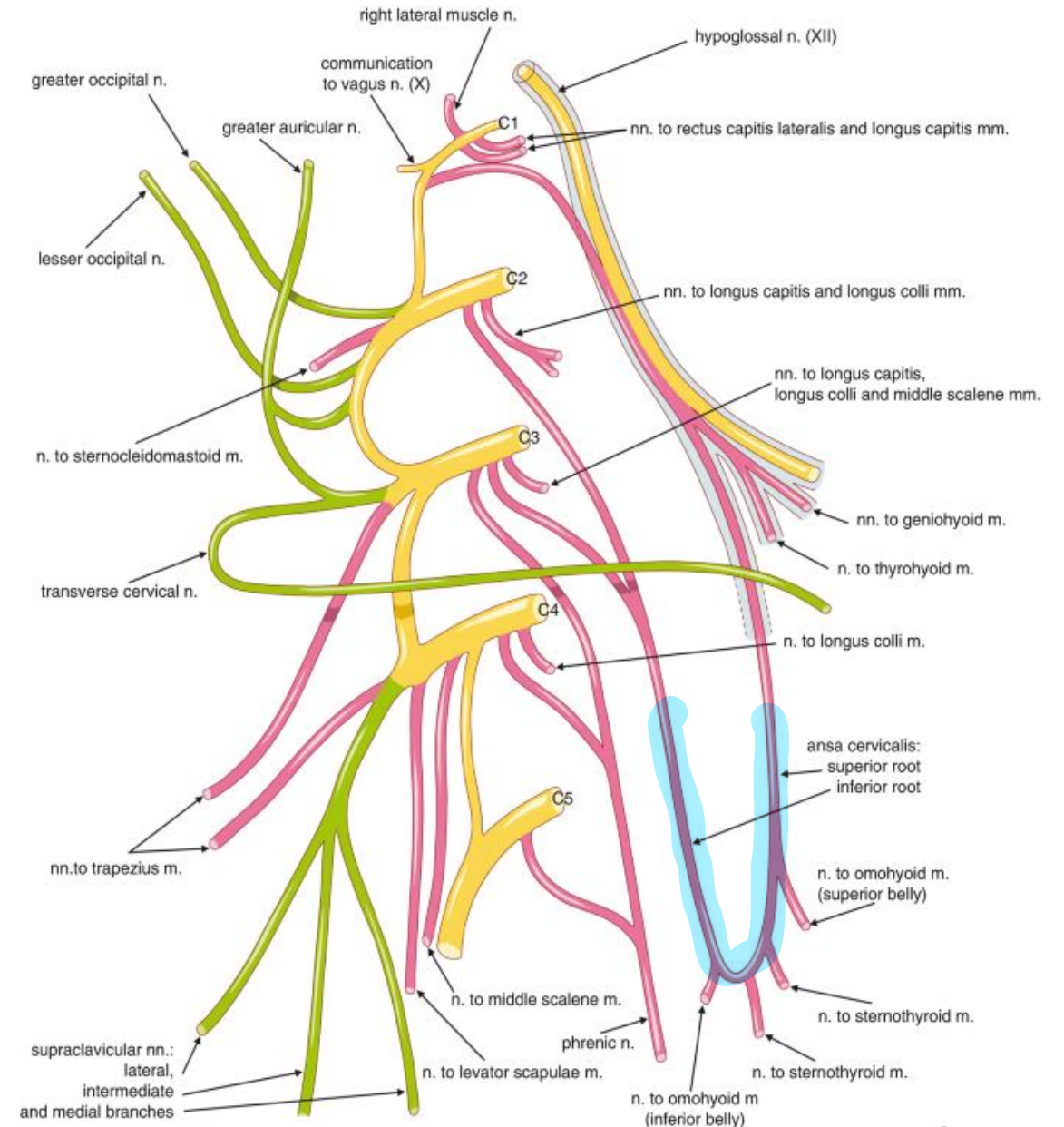
- About one third of persons have an accessory phrenic nerve.
- The **root** from the fifth cervical nerve.
- It usually **joins the phrenic nerve**.

C- Communicating branches of the cervical plexus:

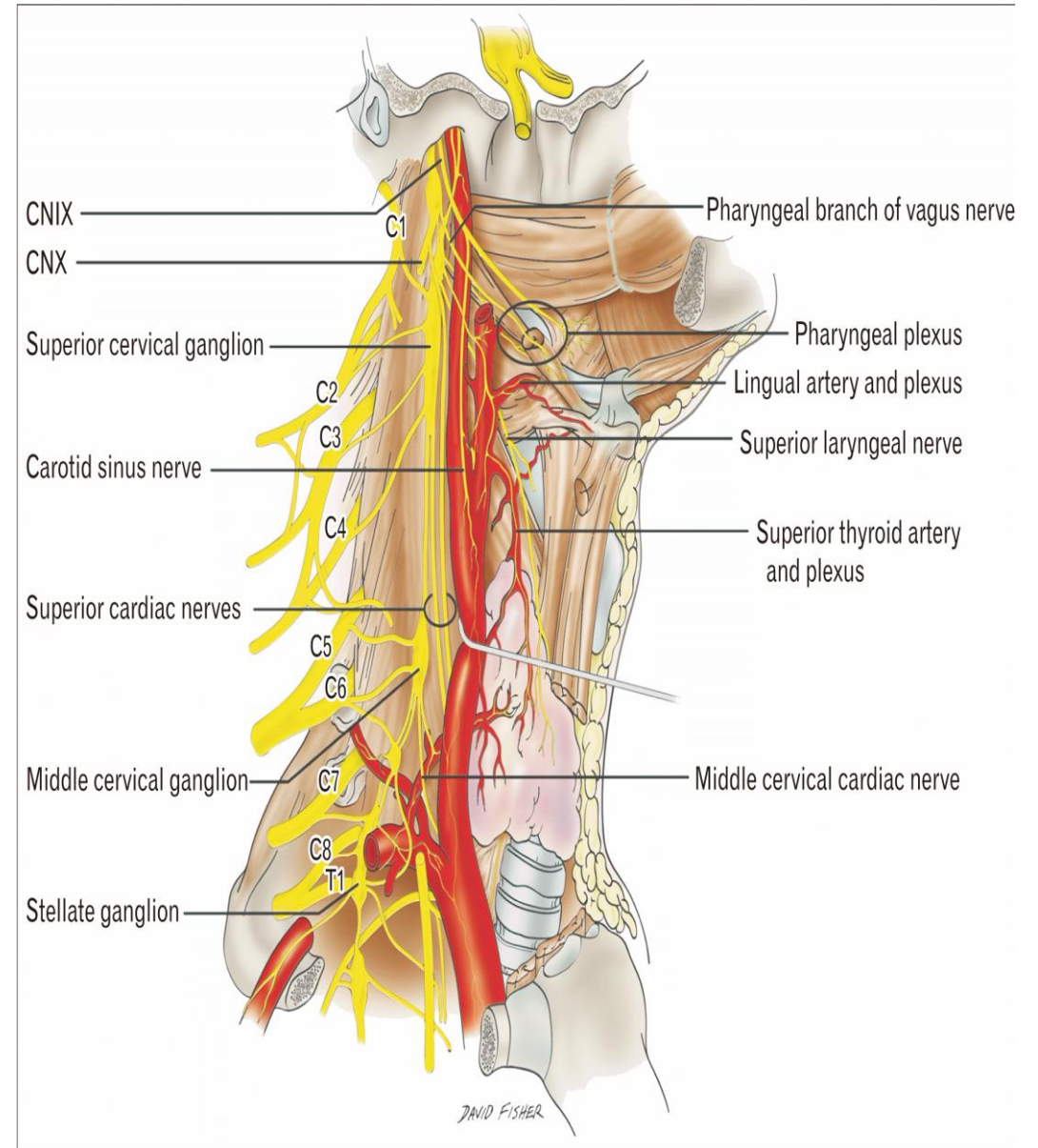
1-To hypoglossal nerve from C1:

Fibers of C1 leaves the hypoglossal nerve as a series of branches;

- **Meningeal** (sensory to dura of posterior cranial fossa). Enters the skull through a foramen
- **Superior root of ansa cervicalis.**
- Nerves to **thyrohyoid and to geniohyoid.**



2-Receives grey rami communicants from the **superior cervical sympathetic ganglion.**



Ansa cervicalis:

Superior root (Descendens hypoglossi) C1

It is a loop of nerves, formed by two roots.

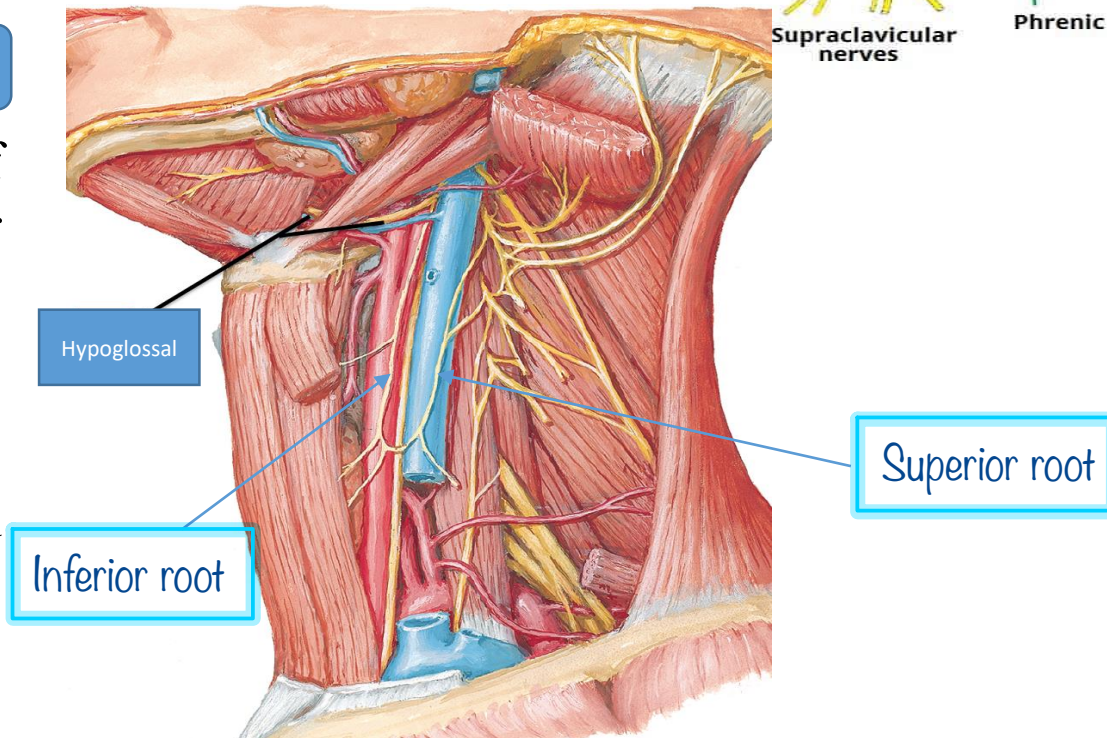
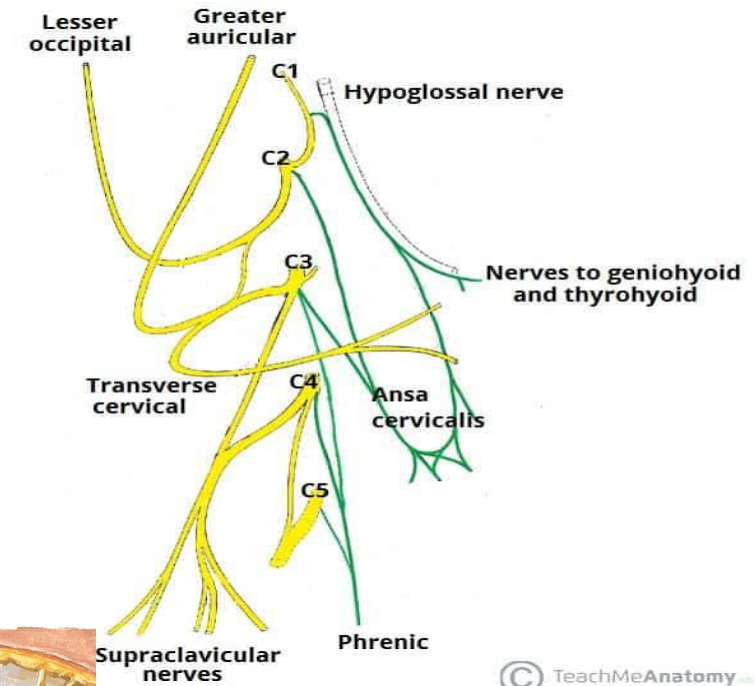
- Leaves the hypoglossal nerve, then descends anterior to the carotid sheath.

Inferior root (Descendens cervicalis) C2&C3

- It curves around the lateral side of the internal jugular vein, to join the superior root.

Branches of ansa cervicalis;

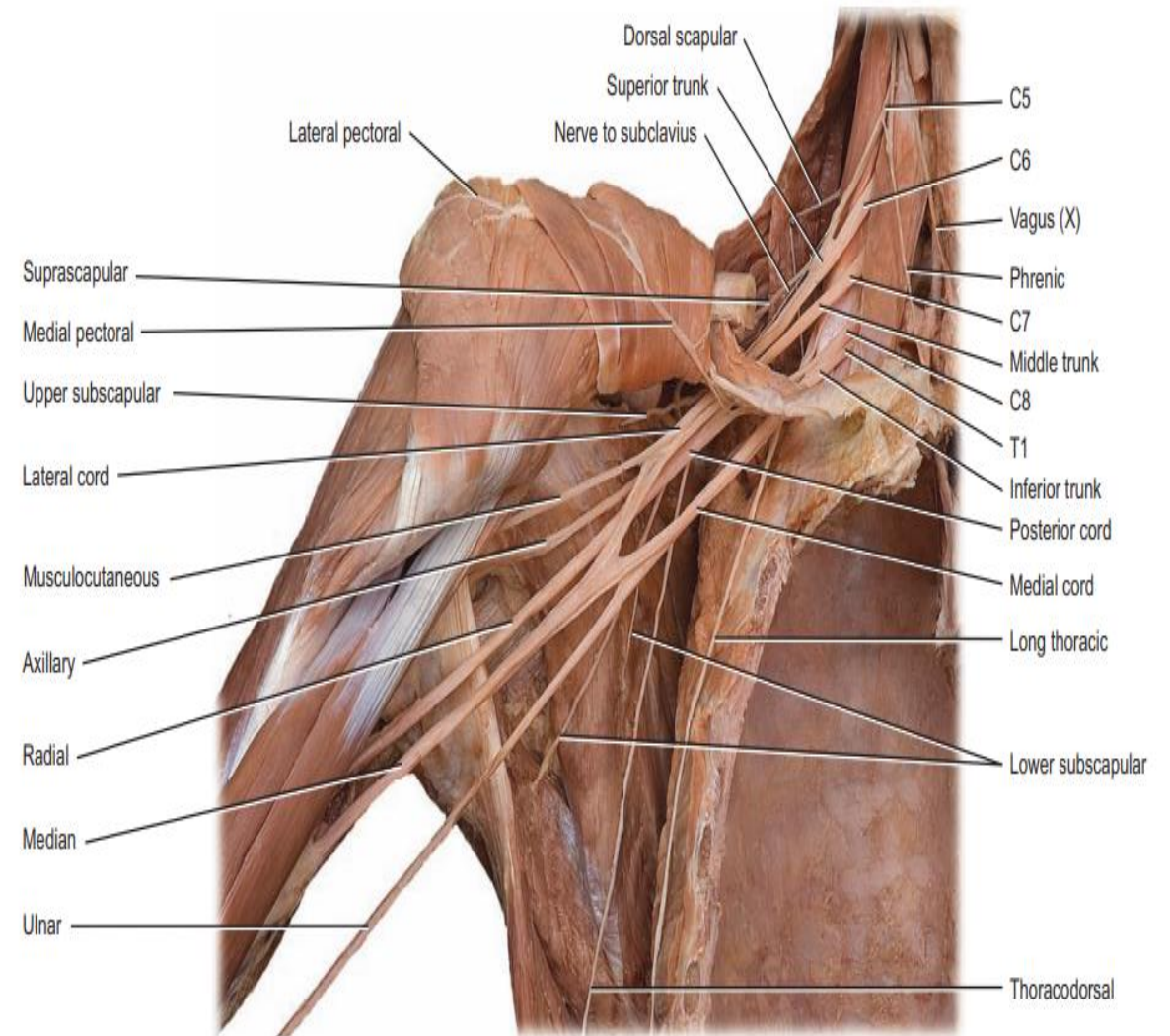
- Supply sternohyoid, sternothyroid and omohyoid.



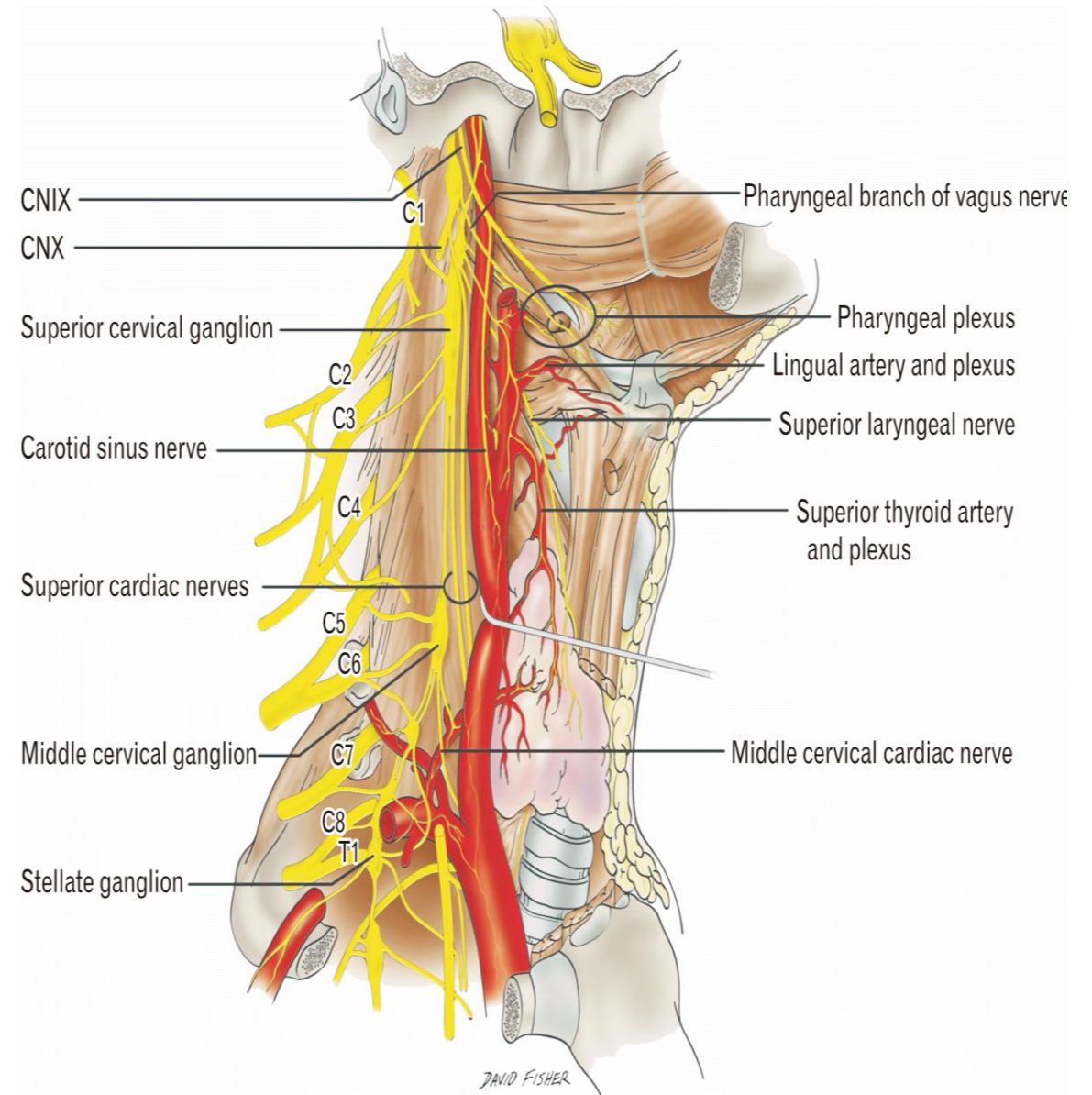
Brachial Plexus

Definition:

- It is network of nerves which descends from the neck to axilla for supplying the skin and muscles of upper limb. Sensory and motor
- The brachial plexus is a somatic nerve plexus formed by intercommunications among the ventral rami of the lower 4 cervical nerves (C5-C8) and the first thoracic nerve (T1).



- The brachial plexus communicates with the sympathetic trunk via gray rami communicants, which join the roots of the plexus.



Formation of the Brachial Plexus

The plexus passes through four stages: Roots, Trunks, Divisions, Cords which ends by branches.

1-Stage of roots

- These are the **ventral rami** of C5,6,7,8 ,T1.
- The roots **lie in the neck** between the **scalenus anterior & scalenus medius**.

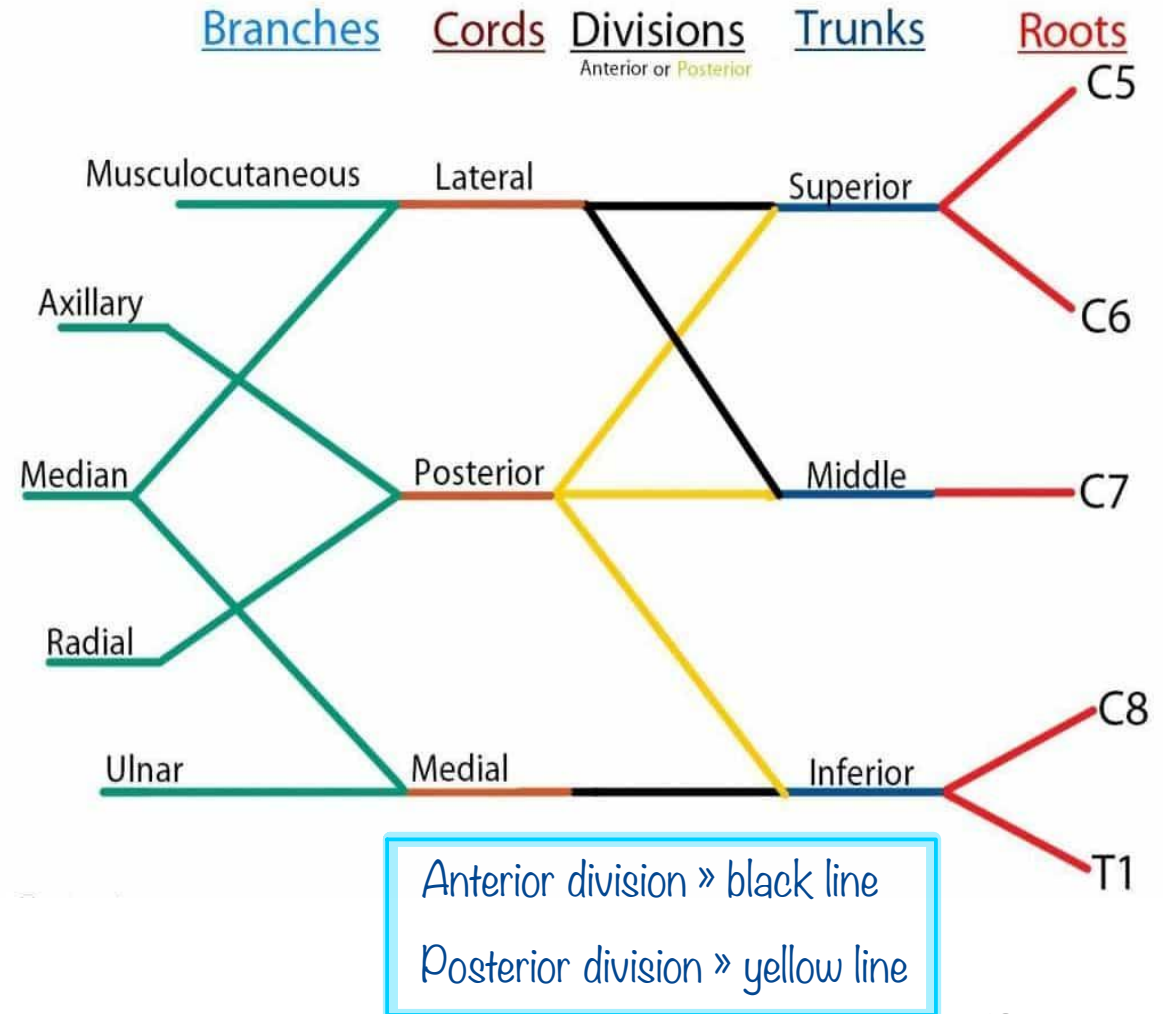
2- Stage of trunks

a-Upper trunk; formed of **union of C5&6 roots**.

b-Middle trunk; formed of **C7 roots alone**.

c-Lower trunk; formed of **union of C8&T1 roots**.

- The trunks **lie in the posterior triangle of the neck**, related to **subclavian artery**.
Just above the clavicle



3- Stage of divisions

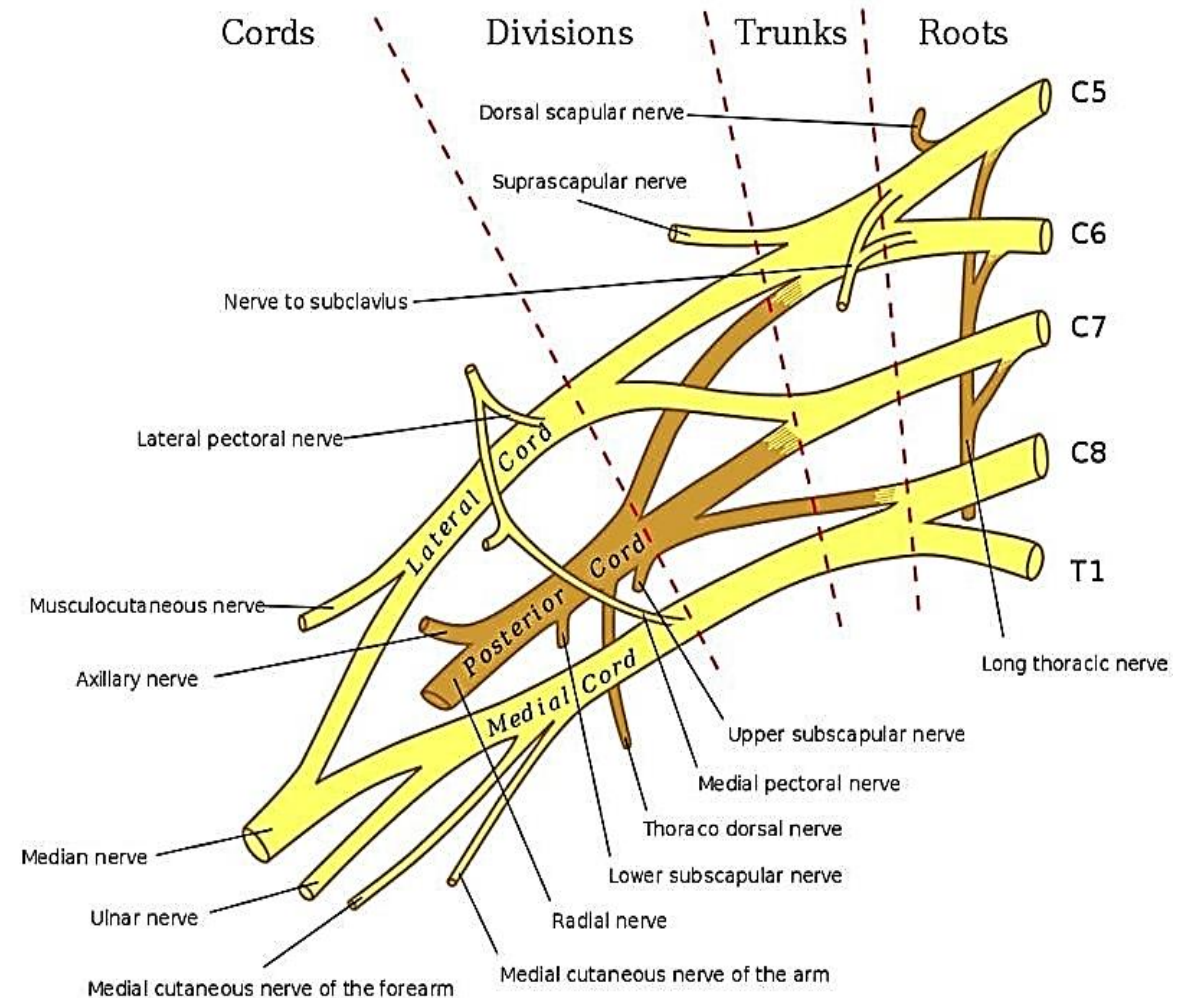
- Each trunk divides into anterior and posterior divisions.

4- Stage of cords

a-Lateral cord (C5,6,7); formed of union of the anterior division of the upper and middle trunks.

b-Posterior cord (C5,6,7,8&T1); formed by union of the posterior divisions of the 3 trunks.

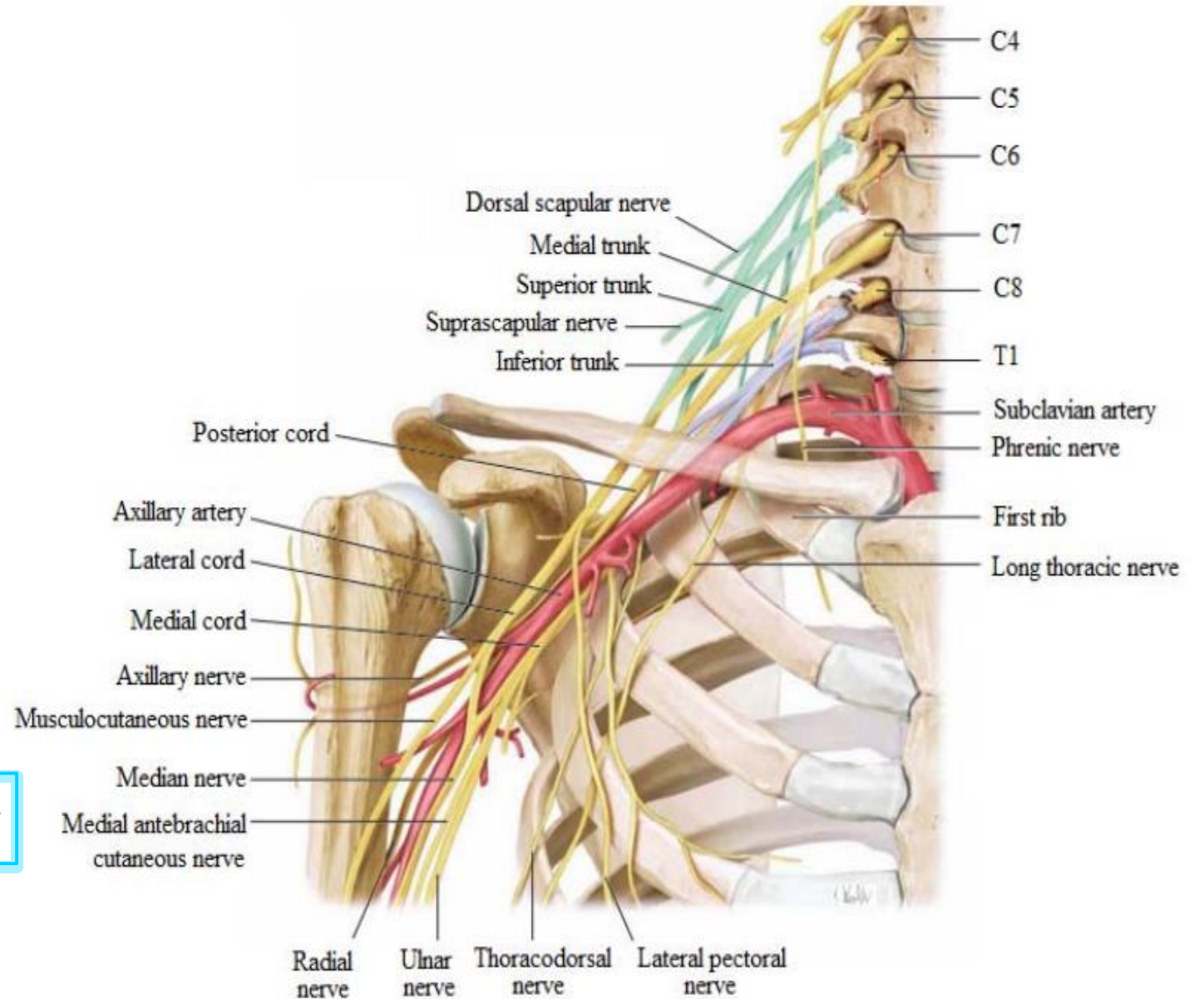
c-Medial cord (C8,T1); formed of the anterior division of the lower trunk only.



Relations of the cords of the brachial plexus:

- The cords **lie in the axilla.**
- The **lateral cord is placed laterally,** the **medial cord lies medially,** and the **posterior cord lies posterior to the second part of the axillary artery.**

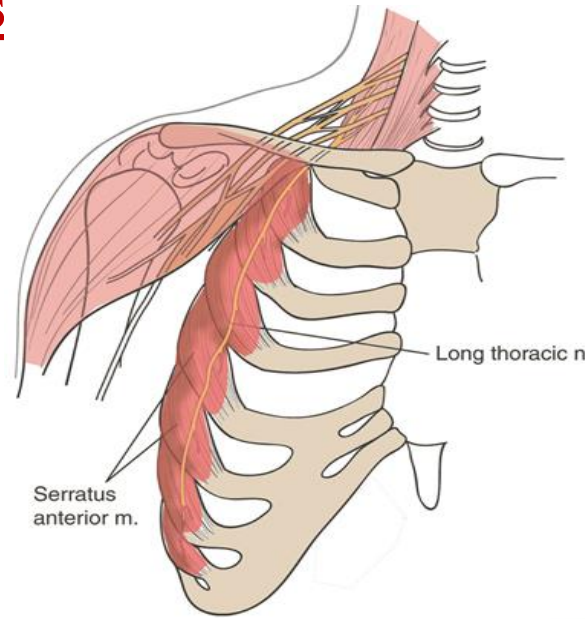
Related to first part but it's branches related to third part



Branches of the brachial plexus

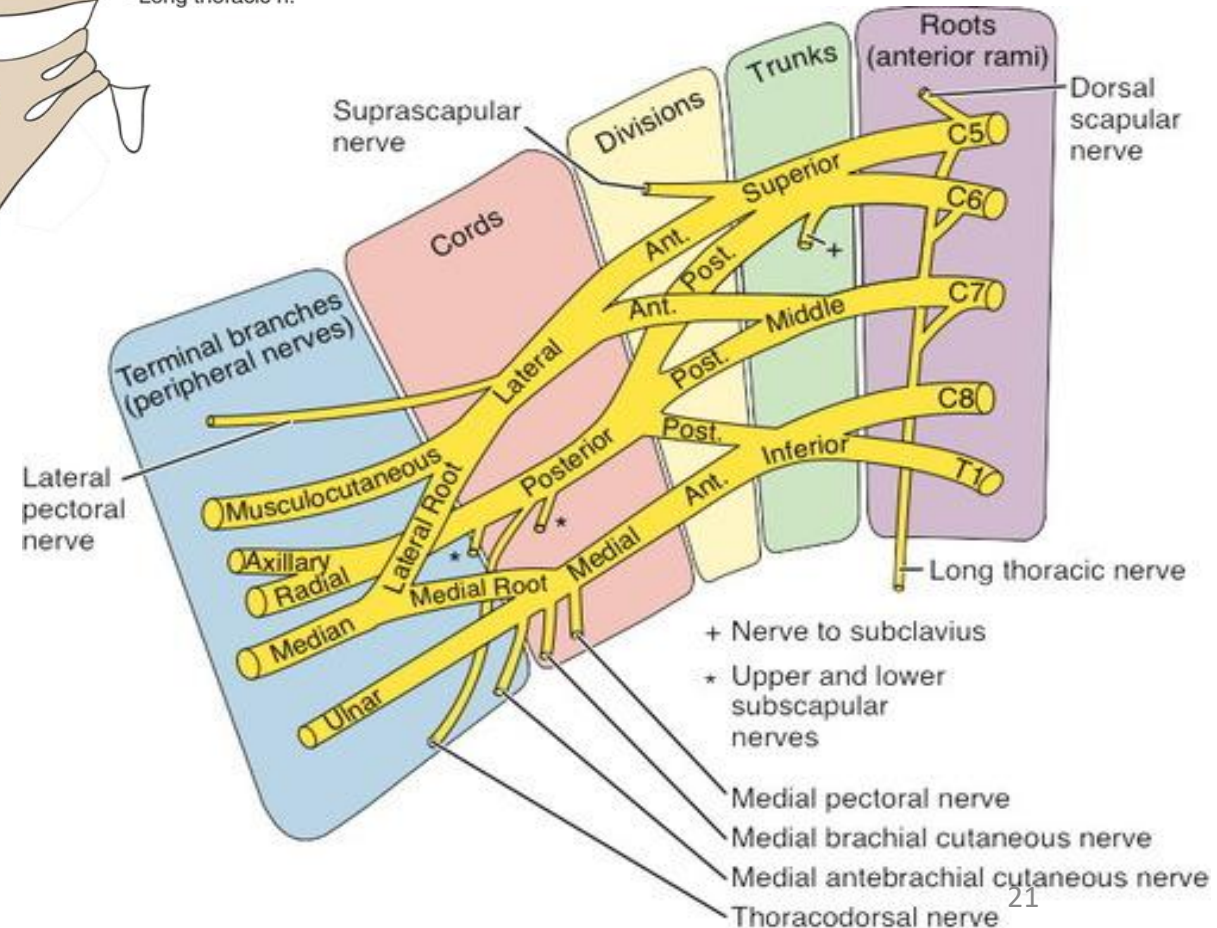
Branches from the roots:

- 1- Dorsal scapular nerve from C5.
- 2- Long thoracic nerve (nerve to serratus anterior): from C5,6,7.



Branches from the upper trunk (C5,6):

- 1- Suprascapular nerve (C5,6).
- 2- Nerve to subclavius (C5,6).





Quiz

Which one of the following branches from the cervical plexus is mixed?

- a. Phrenic.
- b. Great auricular.
- c. Supraclavicular.
- d. Lesser occipital.
- e. Transverse cervical.

Inferior root of Ansa hypoglossi is derived from:

- a. C1.
- b. C2 and C3.
- c. C4 and C5.
- d. C6 and C7.
- e. C8.

A 59-year-old man complains of numbness in the anterior cervical triangle. Damage has therefore occurred to which of the following nerves?

- a. Phrenic nerve
- b. Greater auricular nerve
- c. Transverse cervical nerve
- d. Supraclavicular nerve
- e. Lesser occipital nerve

Ansa Cervicalis innervates the following muscles except.

- a. Omohyoid
- b. Sternohyoid
- c. Sternothyroid.
- d. Genioglossus